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FLOOD PLAIN MANAGEMENT STUDY

MEDOMAK RIVER TOWN OF WALDOBORO LINCOLN COUNTY, MAINE



Prepared by

U.S. Department of Agriculture
Soil Conservation Service
Orono, Maine

in cooperation with
Town of Waldoboro
Knox-Lincoln Soil and Water Conservation District
and the
• Maine Soil and Water Conservation Commission

September 1982

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ACKNOWLEDGEMENTS

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Knox-Lincoln Soil and Water Conservation District

Time and Tide RC&D Project Sponsors

Town of Waldoboro

U.S. Army, Corps of Engineers, Waltham, MA

U.S. Geological Survey, Augusta, ME

National Oceanic and Atmospheric Administration

James W. Sewall Company, Old Town, ME

Maine Soil and Water Conservation Commission

Maine Department of Transportation, Augusta, ME

A special expression of thanks is extended to the corps members and staff of the Young Adult Conservation Corps (YACC) at Camp Tanglewood, Lincolnville, Maine for the outstanding work that was done in performing the field surveys that were so fundamental to this study.

Appreciation is also extended to the many property owners who granted access to their property for obtaining field surveys and gathering other necessary basic data.

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FLOOD PLAIN MANAGEMENT STUDY

MEDOMAK RIVER

WALDOBORO, MAINE

Introduction

This report presents flood plain information along the Medomak River, Little Medomak Pond Outlet Stream and Medomak and Little Medomak Ponds within the town of Waldoboro. Data generated for this study consist of a flood hazard evaluation including flood plain maps and profiles, and an inventory of natural resource values served by the flood plains.

The town of Waldoboro will use the technical information provided in this study to identify flood plain areas and as a guide for developing a flood plain management program for the areas studied. This report will provide to the town a basis upon which to comply with the State of Maine's "Mandatory Zoning and Subdivision Control Law" which apply to shoreland areas. Such regulations are needed to minimize loss of life and property damage from future floods as well as to prevent environmental degradation of the area's resources and to ensure orderly community growth. Data generated by this study will also be useful in the development of conservation plans, RC and D measure plans and in many other types of assistance to communities, groups and conservation district cooperators. Other uses include assistance to agencies such as Farmers Home Administration as well as to provide data for the National Flood Insurance Program.

The study was performed in response to a request by the town of Waldo-boro to the Maine Soil and Water Conservation Commission (MSWCC). A cooperative Plan of Work approved by the town and the MSWCC in July, 1980 and authorized by the Soil Conservation Service (SCS) in August, 1980 provides the basis for funding and also outlines the areas to be included and scope of the study.

The SCS, United States Department of Agriculture, carries out Flood Plain Management Studies under the provisions of Federal Level Recommendation (3) of A Unified National Program for Flood Plain Management, Water Resources Council, September 1979, in accordance with Section 6 of Public Law 83-566, the Watershed Protection and Flood Prevention Act (1954). Priorities of studies in Maine are established by the MSWCC through a Joint Coordination Agreement between the Commission and SCS to carry out these studies.

Description of Study Area

The Medomak River, located in Lincoln, Knox and Waldo Counties, Maine, has a drainage area of 80 square miles to the downstream limit of the study area in the town of Waldoboro. The river begins in the town of Liberty and flows southerly through the towns of Appleton, Union, Washington and Waldoboro to tidewater and thence the Atlantic Ocean. Waldoboro is situated some 160 miles northeast of Boston and 25 miles east of Augusta, (see Location Map). The hydrologic unit code for the area is 01050003.

MEDOMAK RIVER FLOOD PLAIN MANAGEMENT STUDY WALDOBORO, MAINE



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LOCATION MAP

Two separate sections of the New England Physiographic Province occur in Knox and Lincoln Counties. The northern half of the Knox County mainland is in the New England Upland Section, with several hills having summit elevations in the 1000 to 1380 foot range. The southern half of Knox County, including the coastal islands and all of Lincoln County are in the Seaboard Lowland Section, with elevations generally less than 300 to 400 feet. In the uplands, drainage is well developed and topography is mature. The lowlands are rather poorly drained.

The topography ranges from an elevation of 890 NGVD* at the northernmost tip of the watershed in the town of Liberty to sea level in the village of Waldoboro. The watershed is predominately hilly and rolling with several lakes scattered throughout, the largest being:

<u>Name</u>	<u>Surface Area (1)</u> (Acres)	<u>Drainage Area</u> (Square Miles)
Washington Pond	550	4.3
Medomak Pond	240	50.6
Crystal Pond	100	0.9
Kalers Pond	90	0.7
Little Medomak Pond	75	1.2
Pettingill Marsh	60	6.2

Watershed land use is broken down as follows:

Forest Land	75%
Open Land	21%
Water Areas	3%
Urban	1%

*National Geodetic Vertical Datum - formerly Mean Sea Level (MSL) 1929.

(1) Reference number - Bibliography

Agricultural interests include several dairy farms, squash, pumpkin and cabbage farms, corn fields and blueberry fields. Hay and pasture land account for some 90 percent of the open land with the remainder or 10 percent in cultivated crops.

Several hundred million years of the earth's history are represented by the many different kinds of bedrock found in Knox and Lincoln Counties. Since the formation of the area's bedrock, the slow but persistent process of erosion removed a great amount of rock. However, the present landscape is a result of the events of the Pleistocene epoch, which began about 2 million years ago. Huge ice sheets advanced and retreated over Knox and Lincoln Counties probably as many as four times during that period, but evidence remains of only the last major glaciation which occurred about 18 thousand years ago.

Quarrying of marble (metamorphosed limestone) for use in the local manufacturing of Portland cement is of major importance in the area. This material is also used for agricultural lime.

The mining of the area's glacial ice-contact and outwash deposits of sand and gravel for use in the construction industry continues to be of economic importance, as is the production of crushed stone.

The soils in the lowlands and stream terraces are dominantly Boothbay and Swanville soils with a few scattered bottom lands containing Fryeburg soils. A few high stream terraces are gravelly and contain Masardis soils. The soils on the uplands are formed mainly in glacial till and

are dominantly Marlow, Peru, Tunbridge and Lyman soils. Knox and Lincoln Counties have been completely soil mapped and the soil survey is scheduled for publication in January 1984. In the interim, soil information is available for the Medomak River Watershed at the SCS field office in Waldoboro.

The Medomak River is located in the Coastal Climatic Zone and has average daily temperatures that range from 23 F in January to 66 F in July. The average annual precipitation is approximately 44 inches which includes the water equivalent of some 70 inches of snow (2). Although average precipitation is rather evenly distributed throughout the year, monthly totals are about four inches during the winter as compared to three inches during the summer in the Coastal Zone. Thunderstorm activity is somewhat suppressed by the effects of the cool ocean while winter precipitation is increased by coastal storms or "northeasters".

The study area is located within the town of Waldoboro and includes 12 miles of the Medomak River as well as Medomak and Little Medomak Ponds and one mile of Little Medomak Pond outlet stream. There is substantial second home recreational development around Medomak Pond. Other urban type developments in the study area include several manufacturing firms, small businesses and many residences. The development pressures are intensifying at an increasing rate. Close proximity to coastal resort areas is considered to be a major contributing factor in this.

Ten bridges span the Medomak River within the study area (Bridge Data - Appendix). The only operational dam in the study area is located approximately 50 feet downstream from Mill Street. It is presently owned by the town of Waldoboro and used primarily to provide water for fire protection. The dam has a total head of about eight feet. There are remains of several other dams in the town which at one time provided power for mills. In their present condition, however, they do not provide significant water impoundment.

Natural Values

A large portion of the land along the Medomak River at one time was in farms, either under cultivation or in pasture and hayland. Most of those small family farms are now gone with the exception of several beef, sheep, poultry and dairy operations. Many of the old fields have reverted back to brush or woods. The existing open fields along the river are primarily in pasture and hayland although some fields are used to grow corn silage, pumpkins, cabbage and squash. There is some prime farmland directly bordering the river but little is used in active farm operations. Prime farmland maps can be obtained from the SCS field office in Waldoboro.

Historically the Medomak River has had many small dams on it for the purpose of producing power. These dams, the remains of several of which are still in place, were constructed without fishways, thus preventing the establishment of a sea run fishery. Before dams were constructed many

anadromous species including atlantic salmon, sea run trout and alewives migrated up the Medomak River. Now the river supports primarily warm water species of fish including bass, pickerel and perch, although brook trout can be found in the cooler tributaries of the upper reaches.

Several large wetland areas are situated within the watershed, two of which are managed by the Maine Department of Inland Fisheries and Game. The many abandoned fields found along the river that are now reverting back to brush add to the diversity of the area and support a good population of upland game species such as ruffed grouse, snowshoe hare and white-tailed deer.

Recreational uses of the Medomak River in Waldoboro are few. A small picnic area is located in the flood plain adjacent U.S. Route 1. There is limited boating and canoeing because many sections of the river are shallow and narrow and public access is limited. During high water, however, the stretch of river between Ellard Mank Road and U.S. Route 1 can provide exciting white water canoeing. Medomak Pond receives the most recreational use in the study area related to fishing, swimming and boating but here again, public access is limited. A public boat launching area is located downstream of Main Street which provides access to tidal waters.

Hydroelectric power generation is presently being considered as a major use of the Medomak River. Sites that have been identified for further

study are located at Winslow Mills and downstream in Waldoboro village. It is felt that development of these sites would increase the recreation potential of the river. However, care would have to be taken to ensure that flood problems would not be increased by these hydroelectric developments.

Soil erosion along the river is slight although there are several cultivated fields that have high erosion rates. There are also some ongoing logging operations which contribute sediment to the river but for the most part the water quality is good.

The most recent classification of the Medomak River according to Maine Department of Environmental Protection standards is B-2, i.e., waters of this class are acceptable for recreational purposes including water contact recreation, for industrial and potable water supplies after adequate treatment and for fish and wildlife habitat. There are no significant sand and gravel groundwater aquifers mapped within the flood plains studied.

There are no nationally registered historic places or natural landmarks located within the Medomak River flood plain. Additionally there are no noteworthy natural features of geologic or archaeologic significance in evidence. However several nationally registered historic places are located within Waldoboro. These include the Waldoboro Public Library, the Waldoboro Town Pound, the German Church and Cemetery, and Ludwig Godfrey House.

Major items that should be considered to enhance the natural and recreational values of the Medomak River include the adoption of measures that would regulate development within the 100-year flood plain as well as the preparation of an overall use plan for the river that would address such items as public access, recreational facilities and the preservation of significant wildlife habitat areas. Other general recommendations include:

1. Maintain wetland and flood plain vegetation buffers to reduce sedimentation and delivery of chemical pollutants to the water body.
2. Support agricultural practices that minimize nutrient flows into water bodies.
3. Control the use of pesticides, herbicides and fertilizer.
4. Minimize soil erosion on land within or adjacent flood plains.
5. Minimize tree cutting and other vegetation removal.
6. Dispose of spoils and waste materials so as not to contaminate ground and surface water or significantly change land contours.

Additional technical information on the above items may be obtained from the SCS field office or RC and D office in Waldoboro.

Flood Problems

Flooding occurs most frequently in early spring when heavy rains on snow covered or frozen ground produce greater than normal runoff. It is at this time of year that ice breaks loose from streambanks resulting in

potential obstructions to bridge openings and other channel constrictions which can artificially raise flood levels. Flash floods occur on occasion from localized thunderstorms but generally these events produce less runoff than that which is associated with spring flooding.

The most recent flood in the watershed occurred in March, 1977 when in excess of four inches of rain fell on snow covered ground resulting in general high water conditions throughout the watershed. The most serious flooding in the study area occurred at the U.S. Route 1 bridge over the Medomak River in Waldoboro. Ice and floodwater reportedly damaged the bridge deck resulting in traffic being re-routed through Waldoboro village. Flooding of State Route 32 and a trailer park occurred which resulted in the evacuation of several trailers. The picnic area immediately downstream of U.S. Route 1 was flooded to a depth of about two feet. Many small businesses in the area had water in their parking lots. Based upon high water marks in the study area, the frequency of this flood on the Medomak River is estimated to be about 25 years. Other floods occurred in the area in 1936, 1940, 1954, and 1973.

The projected 100-year and 500-year floods will inundate some 521 acres and 601 acres respectively within the study area. The following table summarizes the areas subject to flooding:

Approximate Flood Plain Areas^{1/}
(Acres)

	100-Year	500-Year
Medomak River		
Woodland	242	290
Agricultural Land	10	15
Wetlands	65	65
Urban ^{2/}	<u>17</u>	<u>18</u>
Subtotal	334	388
Medomak Pond		
Woodland	100	114
Wetlands	57	57
Urban ^{2/}	<u>3</u>	<u>3</u>
Subtotal	160	174
Little Medomak Pond		
Woodland	9	10
Agricultural Land	<u>3</u>	<u>4</u>
Subtotal	12	14
Little Medomak Pond Outlet Stream		
Woodland	<u>15</u>	<u>25</u>
GRAND TOTAL	521	601

1/ Does not include normal river, pond or tidal areas.

2/ Includes commercial, residential and vacation properties and roads and bridges.

Approximately 35 properties would experience damage from a 100-year flood. These include 18 residences, 9 vacation properties and 8 commercial properties. Two additional residences are located in the 500-year flood plain.

Flood Plain Management

In 1971 the State of Maine enacted the "Mandatory Zoning and Subdivision Control Law" (Chapter 424, Sec. 4811 thru 4814 of the Maine Statutes) which require all municipal units of government to adopt zoning and subdivision control ordinances for shoreland areas. Shoreland areas are defined as land within 250 feet of the normal high water mark of any pond, river or salt water body and include at least a major portion of the flood plain. Under Waldoboro's present shoreland zoning laws, most of the flood plain areas have been zoned limited residential whereby building permits are required from the town.

Since 1975 Waldoboro has participated in the "Emergency" phase of the National Flood Insurance Program. This permits existing dwellers within the approximate 100-year flood plain to purchase up to \$45,000 worth of flood insurance coverage at subsidized rates on their homes and contents (\$100,000 for multi-family and small businesses). The community must require building permits for all proposed construction and review the permit to assure that sites are reasonably free from flooding. For the flood prone areas it is also required that structures be properly anchored and that construction materials and methods be used that will minimize flood damage.

This report is intended to provide a technical basis for arriving at solutions to minimize potential flood damages. General nonstructural solutions include:

1. Land use planning
2. Flood plain regulations
3. Flood plain acquisition
4. Conservation easements
5. Flood insurance (Regular Program)
6. Periodic maintenance of bridges, culverts, stream channels and dams within the watershed to ensure that flow capacities are not reduced by debris and ice, etc.
7. Flood proofing

Perhaps the most practical means of protecting existing flood prone structures in the study area is by flood proofing and/or diking of individual properties. Additional information on flood proofing and reference material are contained in SCS Technical Release 57, Flood Proofing which can be obtained for nominal cost at:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22151

Project type structural measures such as dams or stream channel improvements are not appropriate here since sufficient flood damages do not exist in the study area to justify the expense of such measures. However the removal of the remains of several old dams in the study area, particularly at Winslow Mills, would improve flow conditions and increase the flood carrying capacity of the channel. This in turn would generally lower flood elevations and reduce the potential for the formation of ice and/or debris dams.

The lakes and ponds and wetlands in the watershed have a significant impact on reducing peak flood flows in the study area by virtue of their ability to temporarily store and absorb excess runoff. It is important therefore that these existing water areas and wetlands be maintained in their present condition with future filling prohibited.

Floodways

Any encroachments in the flood plain which increase the elevation of the land and/or present obstructions to flood flows will reduce the flood carrying capacity, resulting in increased flood heights and flow velocities. Flood hazards both upstream and downstream of the encroachment itself will generally be increased in these situations. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. Under this concept the 100-year flood plain is divided into a floodway

and a floodway fringe. The floodway is the main channel or watercourse plus any adjacent flood plain areas that must be kept free of encroachment so that the 100-year flood can be conveyed without substantial increase in flood heights. Minimum standards of the Federal Insurance Administration (FIA) limit such increases in flood heights to 1.0 foot, provided that hazardous velocities do not result. The floodway fringe includes that portion of the flood plain that can be completely obstructed without increasing the water surface elevation of the 100-year flood by more than 1.0 foot at any point. Theoretical floodways were computed for the Medomak River from Waldoboro village upstream to Medomak Pond and for Little Medomak Pond outlet stream. They were computed on the basis of equal conveyance reduction from each side of the flood plain. Flood plain encroachments were not judged to be appropriate in tidal areas or adjacent to lakes and ponding areas.

Floodway data are not included in this report but may be obtained upon request from the U.S. Soil Conservation Service, USDA Office Building, University of Maine, Orono, Maine 04473, telephone (207)-866-2132.

Use of Technical Data

This report contains flood profiles, photo base flood plain maps, selected valley cross sections and other information which indicate the extent of potential flooding along the Medomak River, Little Medomak Pond Outlet Stream, Medomak Pond and Little Medomak Pond in the town of

Waldoboro. Four floods were analyzed, the 10-year (10 percent chance) flood, 50-year (2 percent chance) flood, 100-year (1 percent chance) flood and the 500-year (0.2 percent chance) flood.

The results of this study are summarized in the Flood Profiles which depict the elevations of the above four floods throughout the study area. The analyses do not account for the unpredictable obstructing effects of ice or other debris which could reduce the capacity of the channel and/or bridges during flooding conditions. Thus, the elevations presented in this report should be considered minimum for flood plain management purposes.

The Flood Plain Maps include a delineation of the 100-year and 500-year flood boundaries and the 100-year flood elevations. Where only one line is shown there is no appreciable difference in the flood boundaries. Due to variations in relief and scale, the areas outlined on the maps are approximate. To check a specific property the user should locate the property on the appropriate Flood Plain Map and read the desired frequency flood elevation from the corresponding location on the Flood Profiles. Cross section locations as shown on the maps and profiles can be used as references for this purpose. By comparing the elevation from the profiles to the surveyed elevation of the property in question, the flooding frequency of that property can be estimated. Flood elevations for Medomak and Little Medomak Ponds are tabulated in the Pond Data table (Appendix). Elevation bench marks which are located on the Flood Plain Map Index and described in the Appendix can be used as starting points to transfer elevations (NGVD) to the desired properties.

Also included are selected valley cross sections which show the relationship of various floods to existing topography under unobstructed flow conditions.

The following tables are contained in the Appendix:

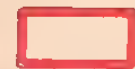
Selected Flood Discharges - provides rates of flow in cubic feet per second for the 10-year, 50-year, 100-year and 500-year floods within the study area. This data can be used as a guide for the hydraulic design of new bridges and/or stream channel modifications.

Bridge Data - presents a summary of flood and other elevations for bridges within the study area. This information can also be obtained from the Flood Profiles.

Pond Data - provides drainage areas and flood elevations for Medomak and Little Medomak Ponds and the location of the nearest elevation bench marks, descriptions of which are included in the Appendix.

Field surveys were obtained during the fall of 1980 and spring of 1981. Only those features in the flood plain at the time the surveys were completed were considered in the computations. Changes of bridge openings and/or flood plain encroachment will affect flood levels and necessitate updating the information given in this report. Additionally, major changes in land use due to unforeseen future development within the watershed could cause a significant increase in flood discharges and require revisions in the data.

LEGEND



FLOOD PLAIN MAP



ELEVATION BENCH MARKS
(SEE APPENDIX)

STUDY AREA

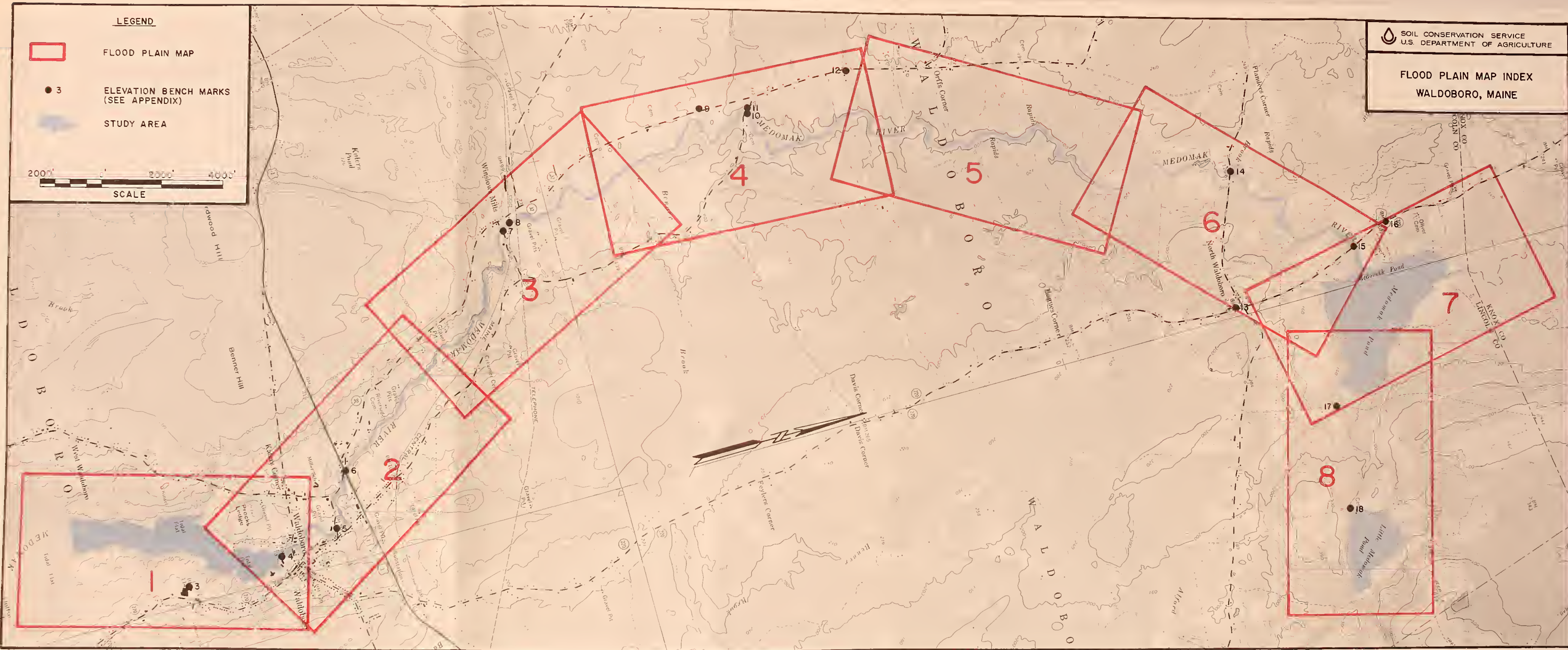


SCALE

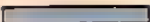
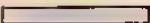




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FLOOD PLAIN MAP INDEX
WALDOBORO, MAINE



LEGEND

-  500 YEAR FLOOD PLAIN
-  100 YEAR FLOOD PLAIN
-  VALLEY CROSS SECTION
-  100 YEAR FLOOD ELEV.



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FLOOD PLAIN MAP
FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE

SHEET 1 OF 8

ELEVATION - FEET NGVD

DOWNSTREAM LIMIT OF STUDY

X-SEC. 01

NOTE: CHANNEL BOTTOM AND FLOOD LINES ARE
STRAIGHT LINE APPROXIMATIONS BETWEEN
SURVEYED CROSS SECTIONS.

500 YEAR
100 YEAR
10 YEAR
1 YEAR

MEAN HIGH TIDE

CHANNEL BOTTOM

DISTANCE IN FEET
ALONG CENTERLINE OF CHANNEL

MATCH LINE SHEET 2

X-SEC. 02

ELEVATION - FEET NGVD

SCALE

HOR. 1" = 500'

VERT. 1" = 5'

FLOOD PROFILES
MEDOMAK RIVER
WALDOBORO, MAINE



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SOIL CONSERVATION SERVICE

Designed <u>L. Crosby</u>	Date <u>1/82</u>	Approved by _____
Drawn <u>C.R. Herrington</u>	<u>3/82</u>	Title _____
Traced <u>S. Dymond</u>	<u>6/82</u>	Title _____
Checked <u>J. Bertolaccini</u>	<u>4/82</u>	Sheet <u>1</u> of <u>7</u> Drawing No. _____

LEGEND

- 500 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN
- 0 VALLEY CROSS SECTION
- 15 100 YEAR FLOOD ELEV.

STATE ROUTE 32

US ROUTE 1

WALDOBORO

MAIN ST

MILL ST

ELM ST

DEPOT STREET

US ROUTE 1

MAINE CENTRAL RR

UPPER DEPOT ST

POWER LINE

500 0 500 1000

PROXIMATE

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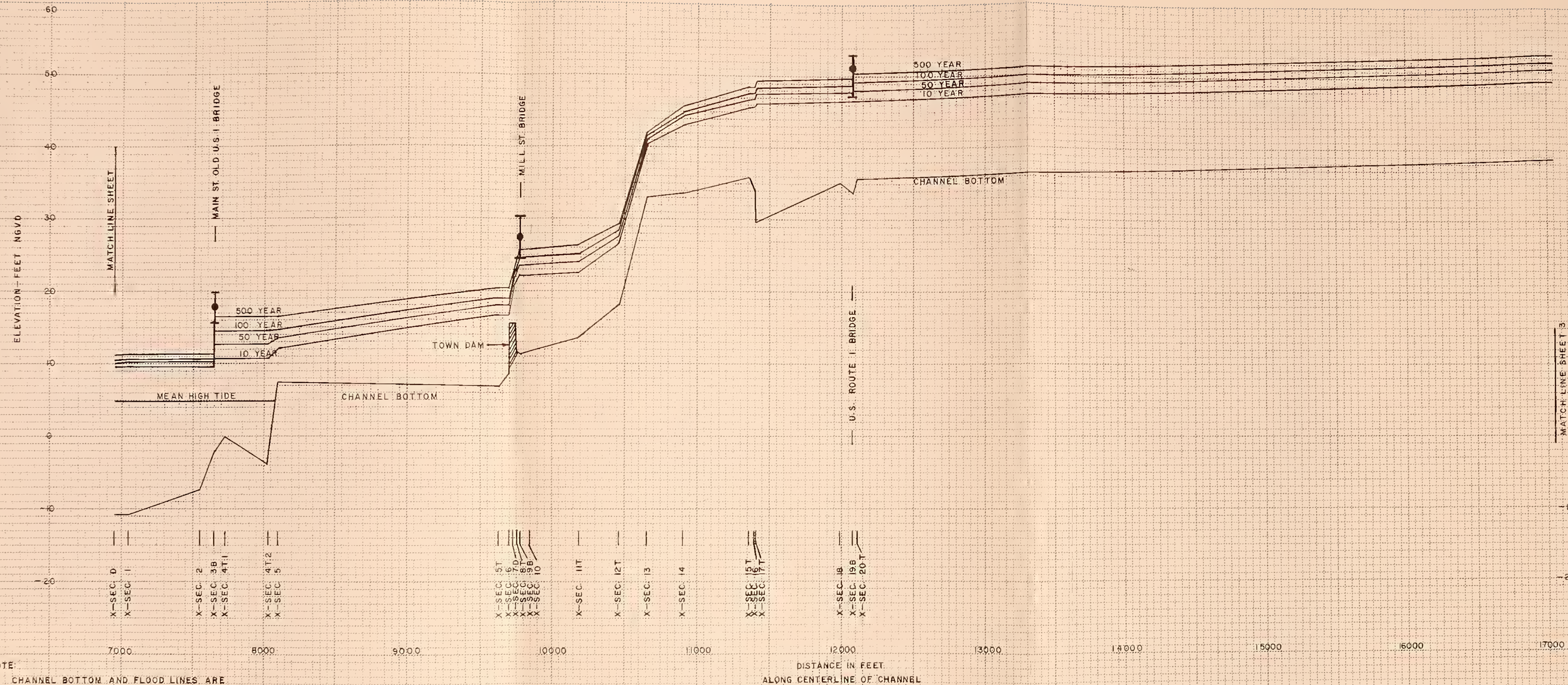
FLOOD PLAIN MAP
FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE
SHEET 2 OF 8

LEGEND

- 500 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN
- VALLEY CROSS SECTION
- 100 YEAR FLOOD ELEV.

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**FLOOD PLAIN MAP
FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE
SHEET 2 OF 8**



LEGEND
 ROAD OVERFLOW
 BRIDGE OVERFLOW
 BRIDGE LOW CHORD

SCALE
 HOR. 1" = 500'
 VERT. 1" = 10'

FLOOD PROFILES MEDOMAK RIVER WALDOBORO, MAINE

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 SOIL CONSERVATION SERVICE

Designed L. Crosby	Date 1/82	Approved by
Drawn C.R. Herrington	3/82	Title
Traced S. Dymond	6/82	Title
Checked J. Bertolaccini	4/82	Sheet No. 2 of 7
		Drawing No.

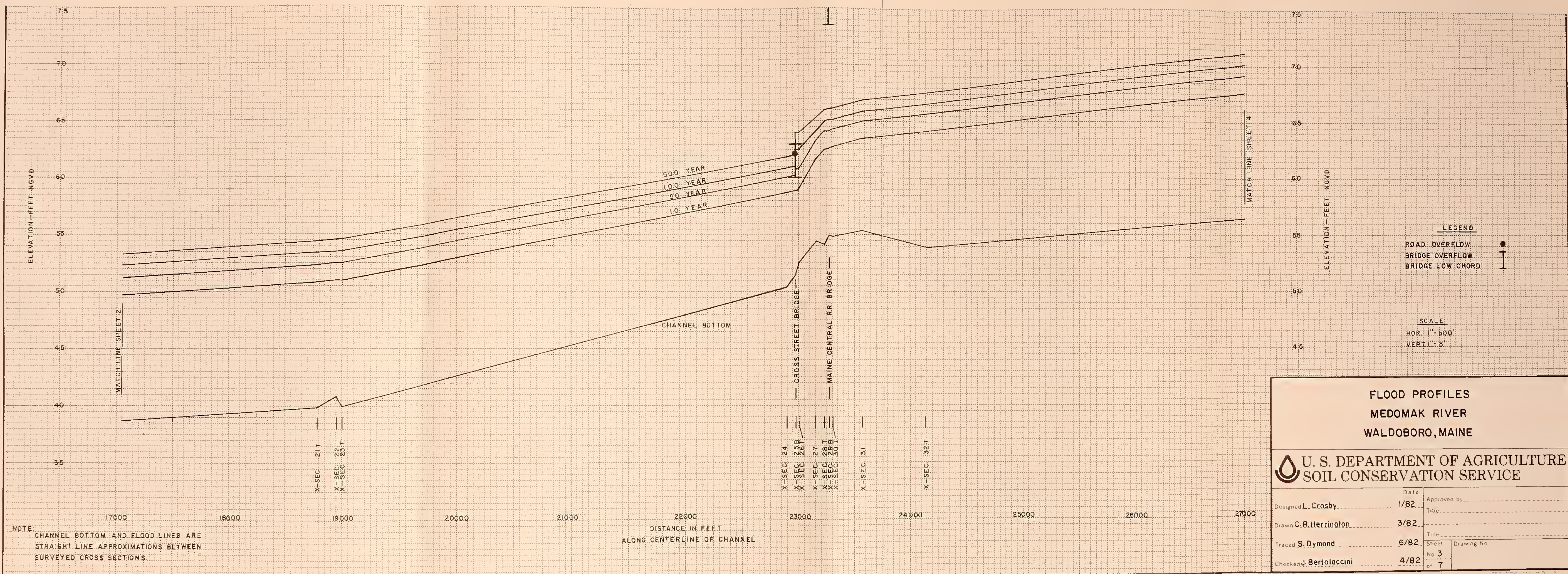
LEGEND





- 500 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN
- 22 VALLEY CROSS SECTION
- 53 100 YEAR FLOOD ELEV.



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FLOOD PLAIN MAP
FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE
SHEET 3 OF 8



 500 YEAR FLOOD PLAIN
 100 YEAR FLOOD PLAIN
 41 VALLEY CROSS SECTION
 71 100 YEAR FLOOD ELEV.

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FLOOD PLAIN MAP

FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE

SHEET 4 OF 8

LEGEND

- 500 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN
- 41 VALLEY CROSS SECTION
- 95 100 YEAR FLOOD ELEV.

ROUTE 32
ORFF'S CORNER
ORFF'S CORNER RD.

STATE

1 MATCH LINE

22



48

14

100

15

94
94
94

103

10

49

106

107

50

SHEET 5

ALPHA LINE

REEF RD.

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FLOOD PLAIN MAP
FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE

SHEET 5 OF 8

500 0 500 1000

APPROXIMATE

WATER MAY VARY FROM
THE GROUND AS EXPLAINED

ERRATA

ELEVATIONS - FEET NGVD

ELEVATION FEET NGVD

MATCH LINE SHEET 4

MATCH LINE SHEET 6

500 YEAR
100 YEAR
50 YEAR
10 YEAR

CHANNEL BOTTOM

X-SEC. 50

50000

50000

SCALE
HOR. 1" = 500'
VERT. 1" = 5'

FLOOD PROFILES
MEDOMAK RIVER
WALDBORO, MAINE



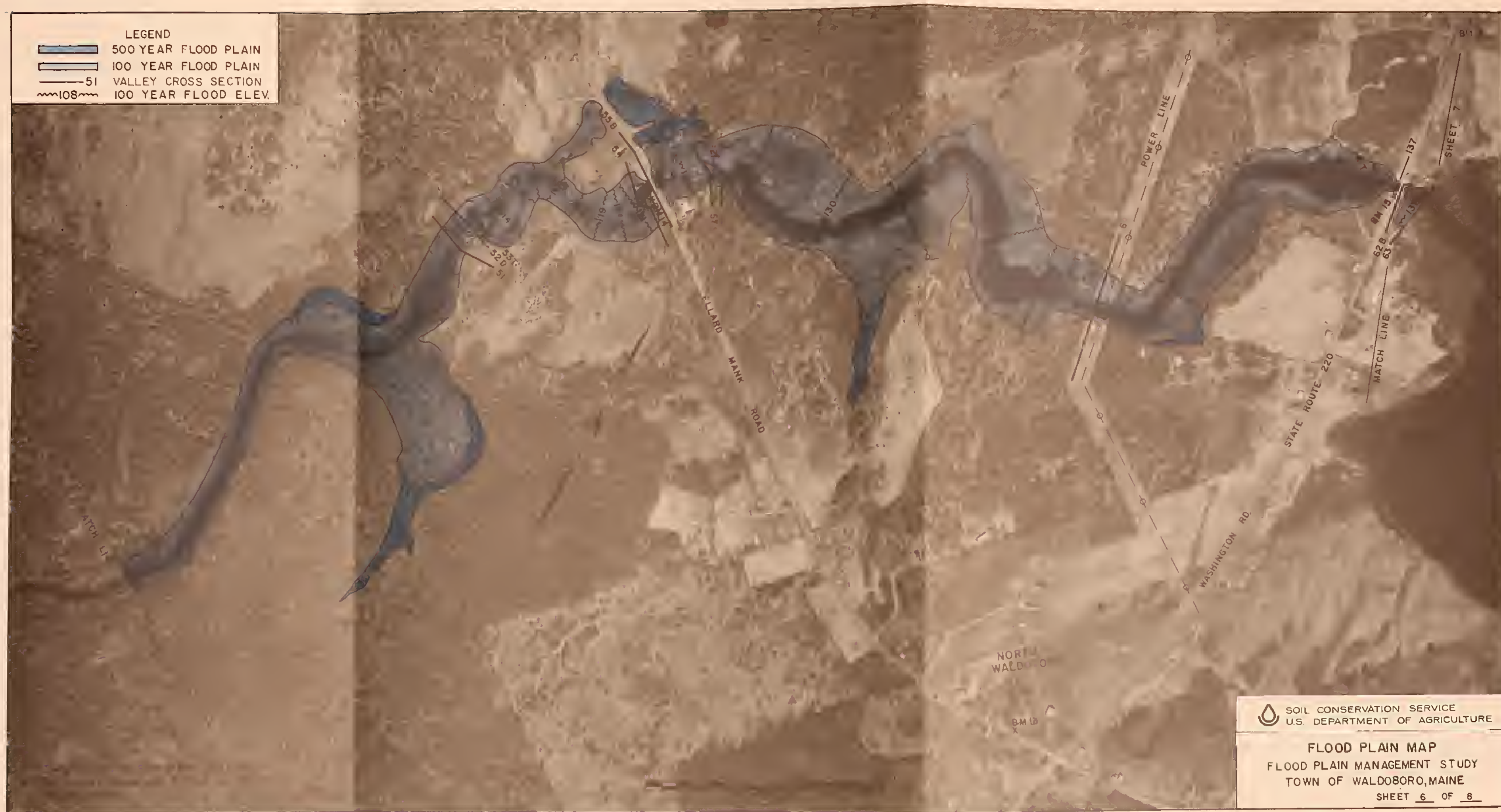
	Date	Approved by
Designed L. Crosby	1/82	Title
Drawn C.R. Harrington	3/82	Title
Traced S. Dymond	6/82	Sheet No. 5 of 7
Checked J. Bertoloccini	4/82	Drawing No.

NOTE:
CHANNEL BOTTOM AND FLOOD LINES ARE
STRAIGHT LINE APPROXIMATIONS BETWEEN
SURVEYED CROSS SECTIONS.

DISTANCE IN FEET
ALONG CENTERLINE OF CHANNEL

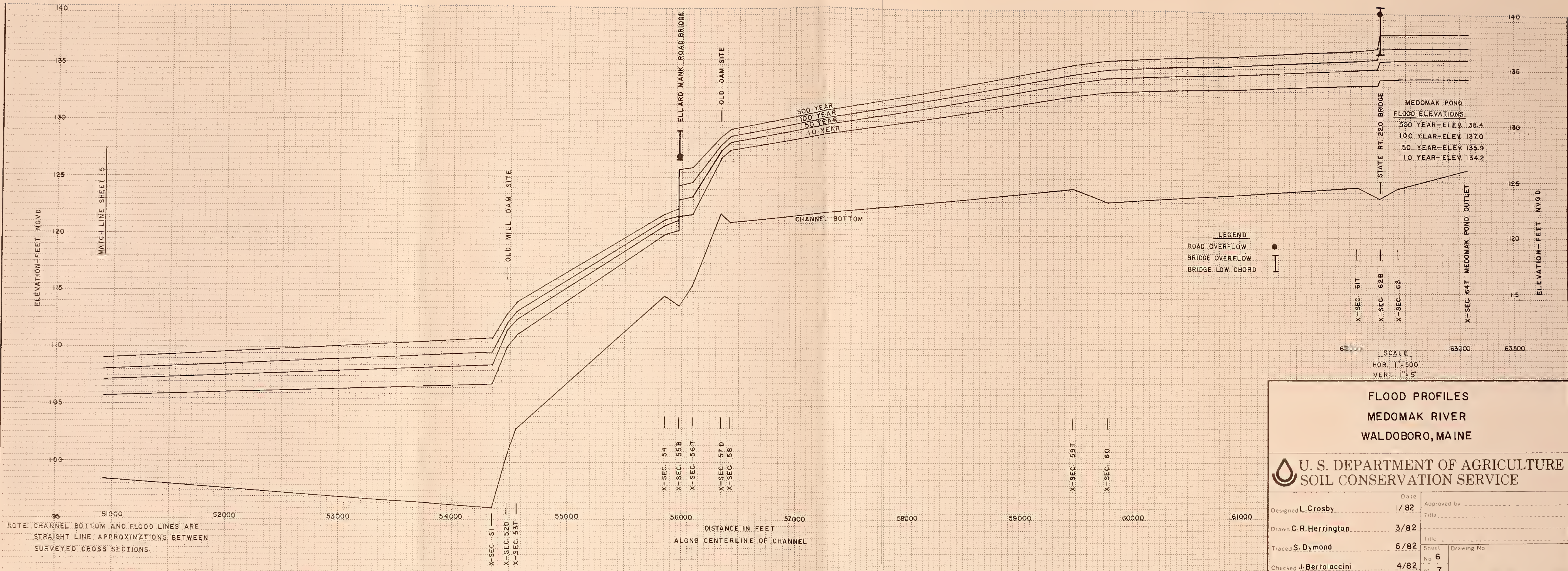
SCS FIG. 317-B-4a-1

LEGEND
500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
51 VALLEY CROSS SECTION
108 100 YEAR FLOOD ELEV.



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U.S. DEPARTMENT OF AGRICULTURE

FLOOD PLAIN MAP
FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE
SHEET 6 OF 8



NOTE: CHANNEL BOTTOM AND FLOOD LINES ARE STRAIGHT LINE APPROXIMATIONS BETWEEN SURVEYED CROSS SECTIONS.

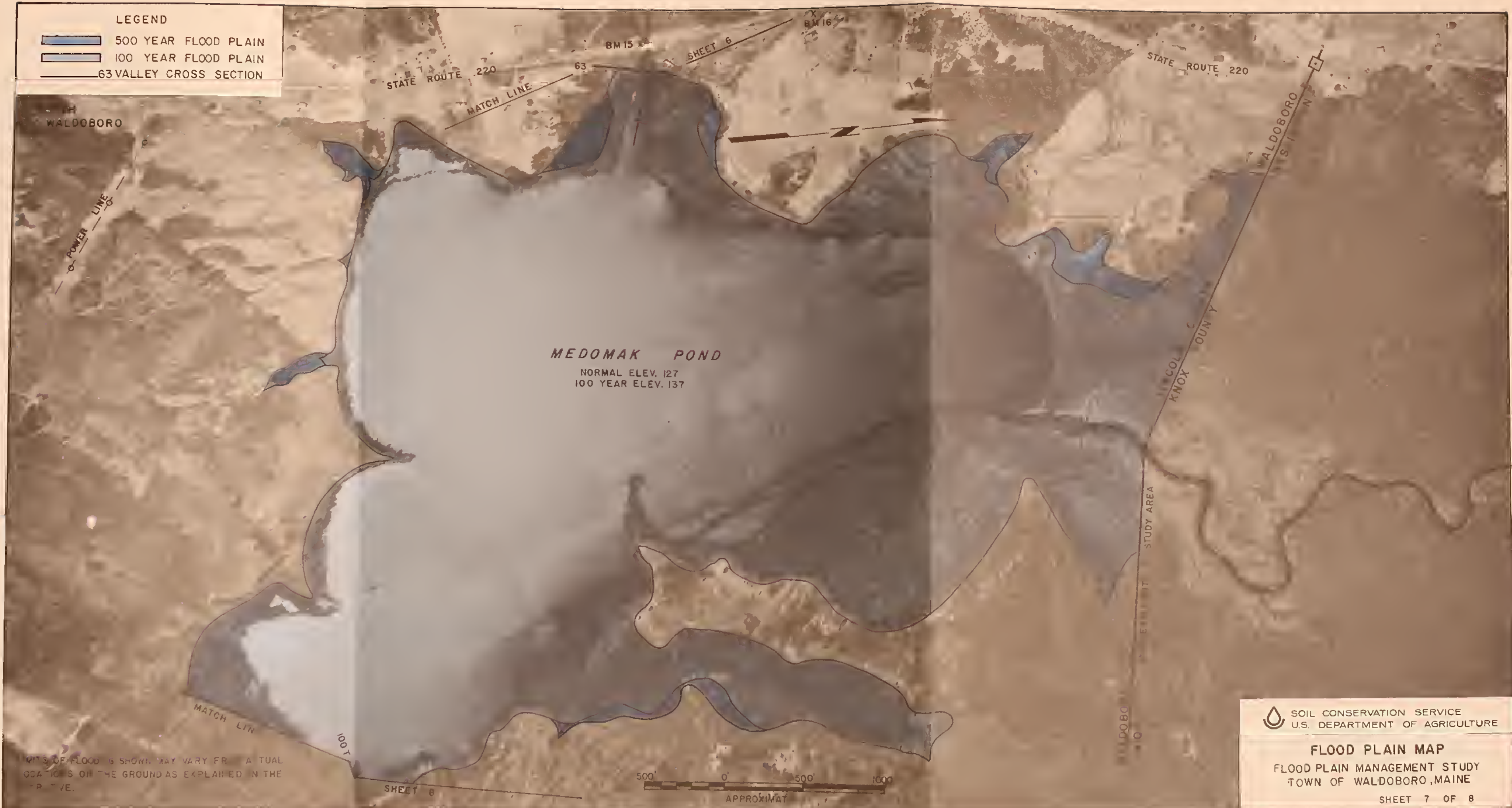
FLOOD PROFILES
MEDOMAK RIVER
WALDOBORO, MAINE



Designed <u>L. Crosby</u>		Date <u>1/82</u>	Approved by _____	
Drawn <u>C. R. Herrington</u>		<u>3/82</u>	Title _____	
Traced <u>S. Dymond</u>		<u>6/82</u>	Sheet _____	
Checked <u>J. Bertolaccini</u>		<u>4/82</u>	No. <u>6</u>	Drawing No. _____
			of <u>7</u>	

LEGEND

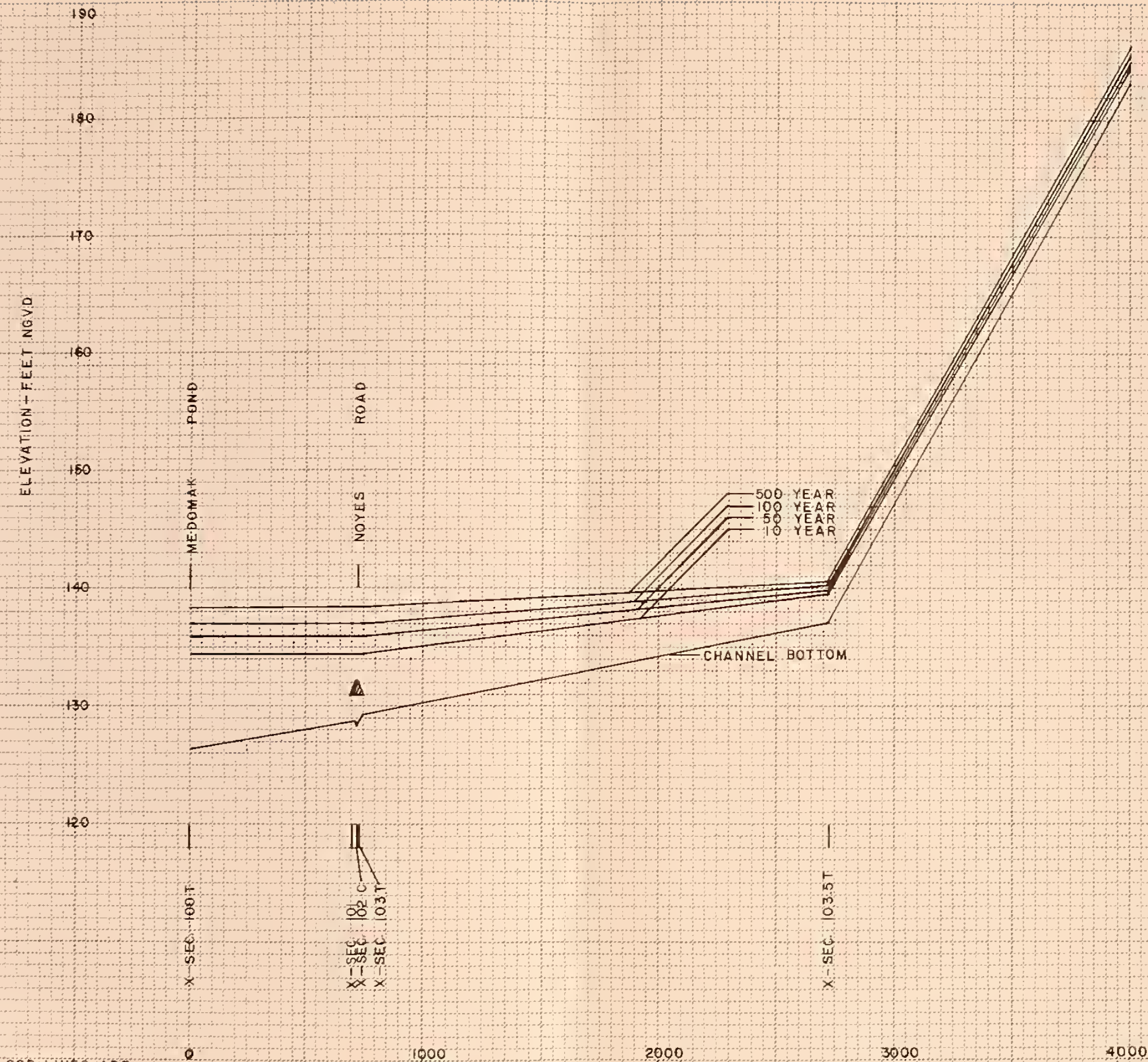
- 500 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN
- 63 VALLEY CROSS SECTION



SOIL CONSERVATION SERVICE
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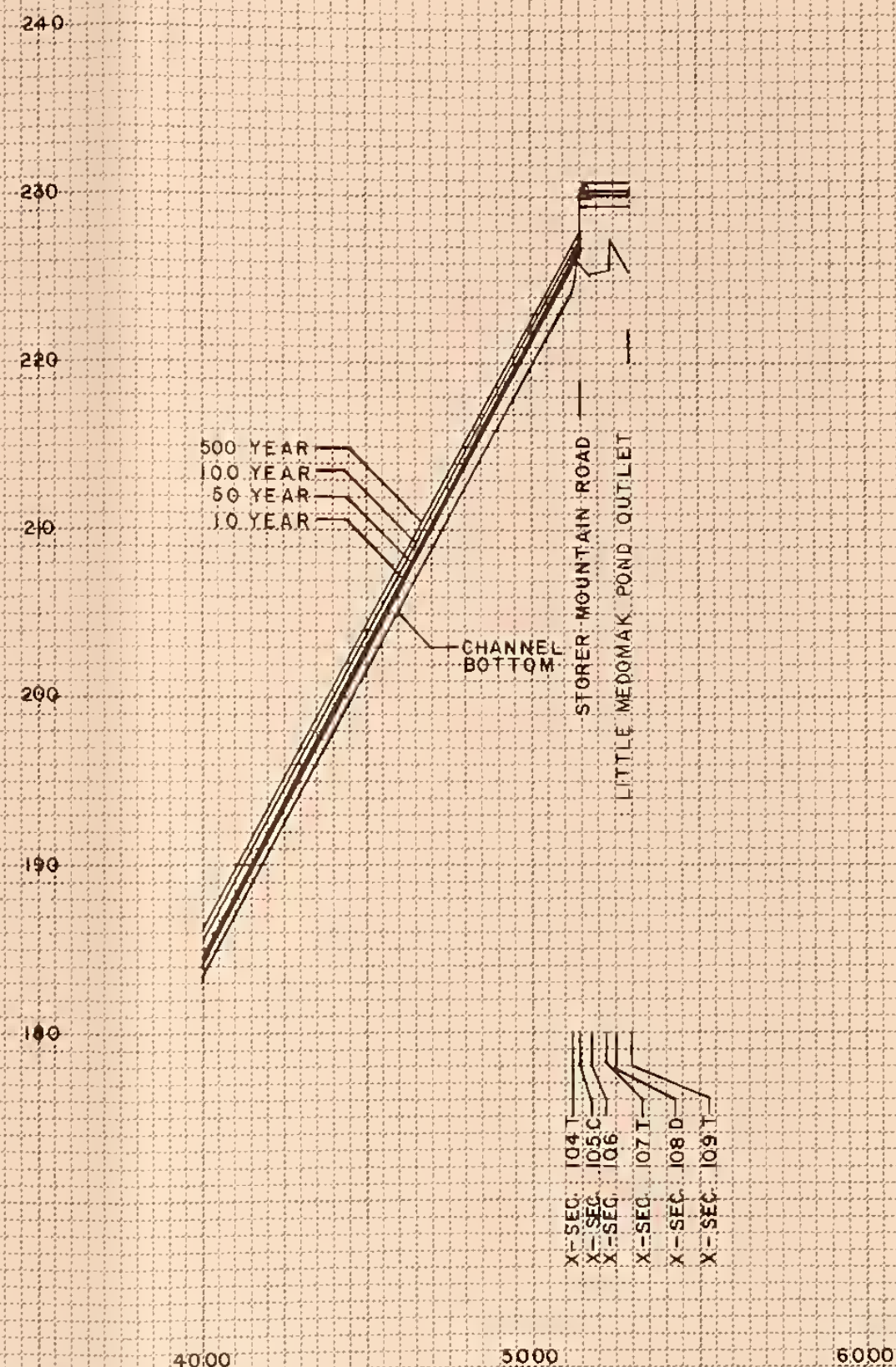
FLOOD PLAIN MAP FLOOD PLAIN MANAGEMENT STUDY TOWN OF WALDOBORO, MAINE

MEDOMAK POND
FLOOD ELEVATIONS
500 YEAR-ELEV. 138.4
100 YEAR-ELEV. 137.0
50 YEAR-ELEV. 135.9
10 YEAR-ELEV. 134.2



NOTE: CHANNEL BOTTOM AND FLOOD LINES ARE
STRAIGHT LINE APPROXIMATIONS BETWEEN
SURVEYED CROSS SECTIONS.

DISTANCE IN FEET
ALONG CENTERLINE OF CHANNEL



LITTLE MEDOMAK POND
FLOOD ELEVATIONS
500 YEAR-ELEV. 231.0
100 YEAR-ELEV. 230.5
50 YEAR-ELEV. 230.1
10 YEAR-ELEV. 229.5

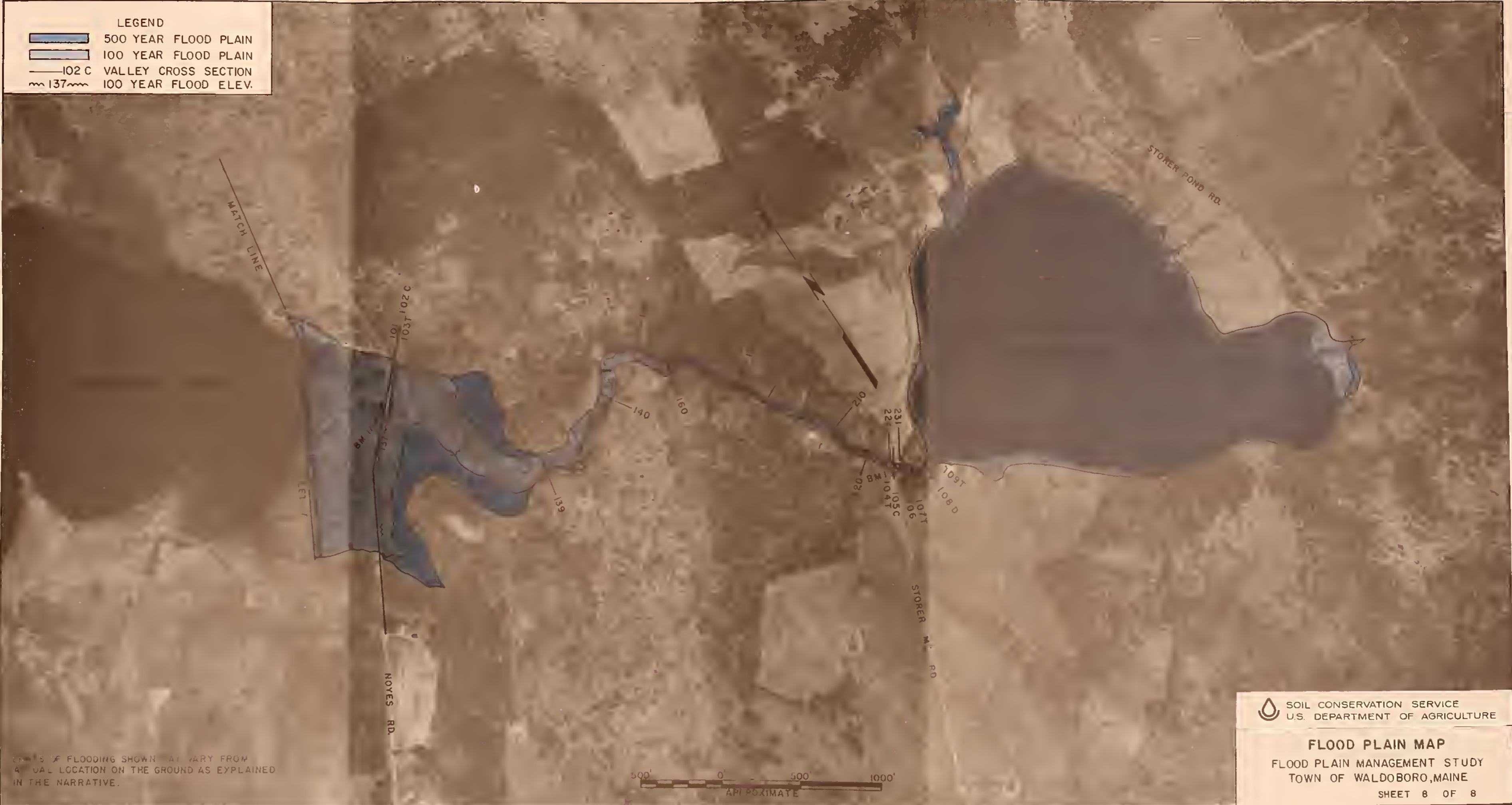
LEGEND
ROAD OVERFLOW
TOP OF CULVERT
CULVERT INVERT

SCALE
HOR. 1"=500'
VERT. 1"=10'

FLOOD PROFILES LITTLE MEDOMAK POND OUTLET STREAM WALDOBORO, MAINE

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed <u>L. Crosby</u>	Date <u>1/82</u>	Approved by _____
Drawn <u>C.R. Herrington</u>	Date <u>2/82</u>	Title _____
Traced <u>S. Dymond</u>	Date <u>5/82</u>	Title _____
Checked <u>J. Bertolaccini</u>	Date <u>3/82</u>	Sheet No. <u>7</u> of <u>7</u>
		Drawing No. _____



LEGEND

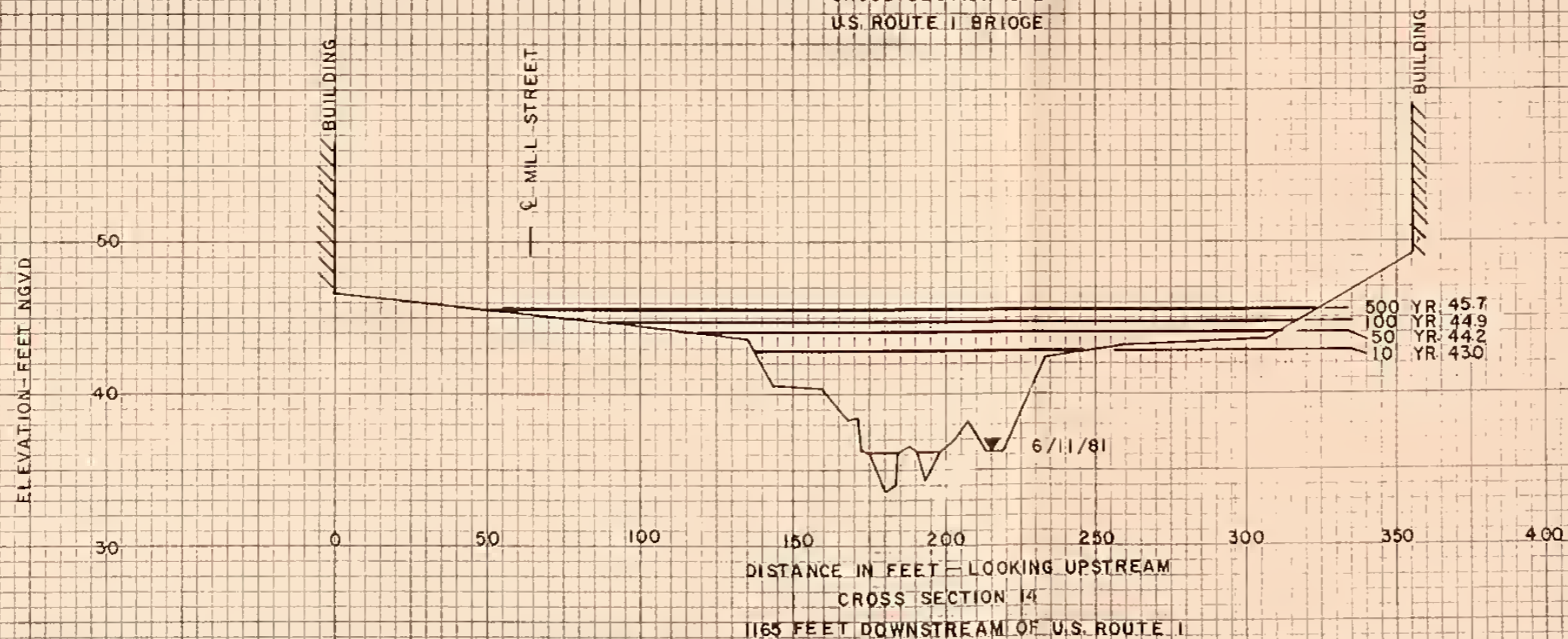
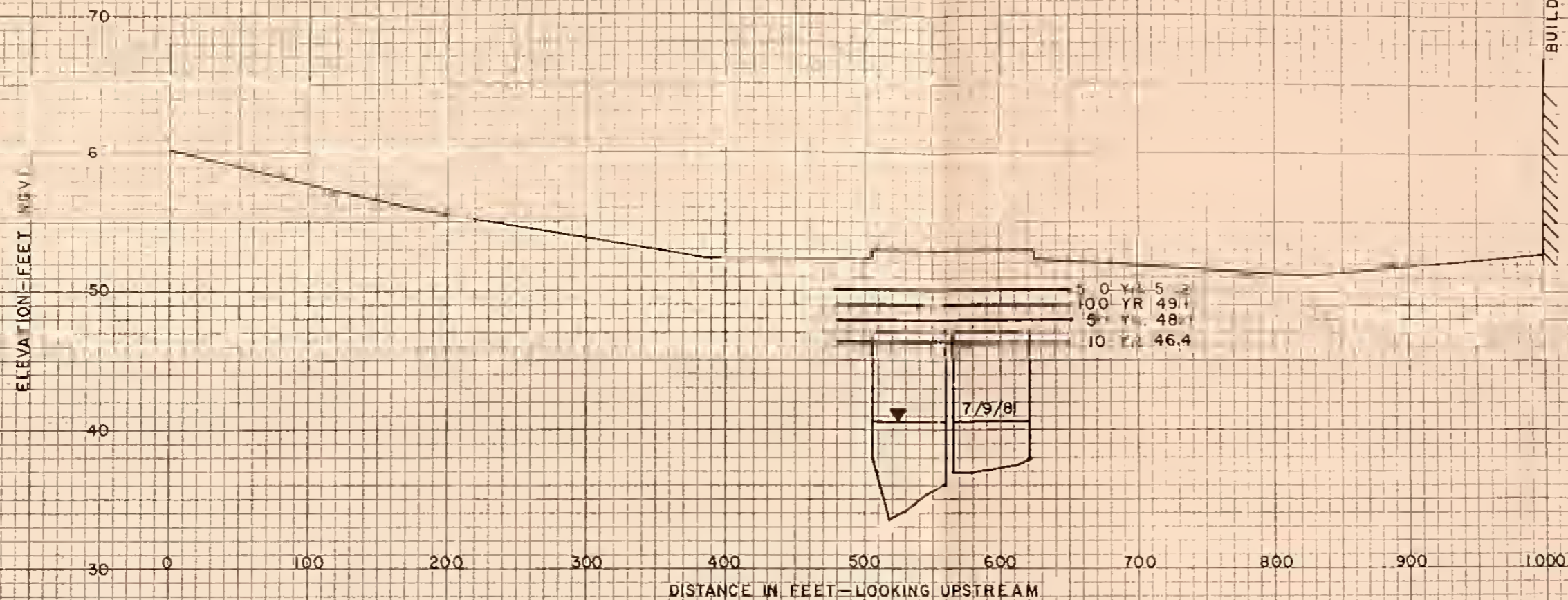
- 500 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN
- 102 C VALLEY CROSS SECTION
- 137 100 YEAR FLOOD ELEV.

EXTENT OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATION ON THE GROUND AS EXPLAINED IN THE NARRATIVE.

500' 0' 500' 1000'
APPROXIMATE

SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

FLOOD PLAIN MAP
FLOOD PLAIN MANAGEMENT STUDY
TOWN OF WALDOBORO, MAINE
SHEET 8 OF 8



SELECTED VALLEY CROSS SECTIONS
MEDOMAK RIVER
WALDOBORO, MAINE

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed by	L. Crosby	Date	2/81	Approved by	
Drawn by	C.R. Herrington	Date	2/82	Checked by	
Typed by	S. Dymond	Date	6/82	Reviewed by	
Checked by	J. Bartolacci	Date	3/82	Project No.	

APPENDIX

Investigations and Analyses

Topographic data were obtained from surveyed valley and bridge cross sections and U.S. Geological Survey topographic maps (3). Elevations are based upon National Geodetic Vertical Datum, 1929 (NGVD). Elevation bench marks that were used for this study are described in the Appendix and located on the Flood Plain Map Index.

Flood flows for various frequencies were computed from an analysis of stream hydraulics, soil cover, land use and rainfall data using the SCS TR-20 hydrologic evaluation model (4). Flood hydrographs were reservoir routed through four ponds in the watershed. Following an analysis of the Type I - one day, two day, four day, seven day, and ten day 100-year storms it was found that the two day storm produced the highest discharges in the study area and was used for the flood hazard evaluation. A table of Selected Flood Discharges is included in the Appendix. Flood elevations on Medomak and Little Medomak Ponds were established by the level pool reservoir routing procedure included in TR-20.

Water surface profiles for various floods were computed by the WSP2 computer program (5). Starting elevations were computed from tidal frequency data (6).

The boundaries of the 100-year and 500-year floods as shown on the maps were delineated from flood elevations determined at each cross section; between cross sections the boundaries were interpolated from USGS topographic maps (3) and aerial photographs (7).

On May 3, 1982 a preliminary meeting was held with town officials to review a draft of the report and to solicit comments.

Field survey information, engineering computations, and other data pertinent to the study are on file with the Soil Conservation Service, USDA Office Building, University of Maine, Orono, Maine 04473, telephone (207) 866-2132.

SELECTED FLOOD DISCHARGES

Cross Section No.	Location	Drainage Area (Mi ²)	Flood Discharges (CFS)			
			10-Year	50-Year	100-Year	500-Year
MEDOMAK RIVER						
3B	Main Street	78.00	2,300	3,500	4,480	5,690
9B	Mill Street	77.69	2,310	3,520	4,490	5,700
19B	U.S. Route 1	75.76	2,400	3,610	4,560	5,730
25B	Gross Street	72.44	2,370	3,530	4,450	5,580
36B	Wagner Bridge Road	63.86	2,110	3,150	3,980	4,980
55B	Ellard Mank Road	55.78	1,920	2,890	3,660	4,590
62B	State Route 220	50.70	1,800	2,720	3,450	4,330
LITTLE MEDOMAK POND OUTLET STREAM						
102C	Noyes Road	1.57	115	165	215	270
105C	Storer Mountain Road	1.20	50	65	80	105

BRIDGE DATA

Cross Section No.	Location	Channel Bottom Elevations	Low Chord Elevations	Road Overflow Elevations	10-Year	Flood Elevations 50-Year	100-Year	500-Year
MEDOMAK RIVER								
3B	Main Street	-	15.6	18.0	10.6	12.5	14.4	16.4
9B	Mill Street	11.2	24.8	27.6	22.1	23.5	24.5	25.7
19B	U.S. Route 1	33.8	47.1	51.1	46.4	48.0	49.1	50.2
25B	Cross Street	51.4	60.1	62.2	59.0	60.8	62.5	64.0
29B	Maine Central R.R.	54.9	73.7	76.8	62.6	64.1	65.1	66.1
36B	Wagner Bridge Road	71.8	82.5	84.5	79.7	81.7	83.1	84.9
55B	Ellard Mank Road	113.8	126.7	126.9	121.6	123.1	124.3	125.8
62B	State Route 220	123.5	136.4	140.0	134.1	135.7	136.8	138.1
LITTLE MEDOMAK POND OUTLET STREAM								
102C	Noyes Road	128.4	131.4	132.1	134.2	135.9	137.0	138.4
105C	Storer Mountain Road	226.1	230.1	230.5	229.4	230.1	230.5	231.0

Elevations refer to feet NGVD 1929, at upstream end of bridge opening.

POND DATA

Name	Nearest Elevation Bench Mark ^{1/}	Drainage Area (Mi ²)	Assumed Elevation at Beginning of Storm ^{2/}	10-Year	50-Year	100-Year	500-Year
Medomak Pond	15, 16, 17	50.65	127.5	134.2	135.9	137.0	138.4
Little Medomak Pond	18	1.19	228.2	229.5	230.1	230.5	231.0

1/ Refer to Bench Mark Descriptions - Appendix.

2/ Elevations refer to NGVD, 1929.

Bench Mark Descriptions

1. USGS BM, Elev. 138.060

Waldoboro; 2.1 miles south of the junction of old U.S. Route 1 (Main Street), along State Route 32, on east side of road at the home of Mr. R. J. Peterson, 61 feet east of road centerline, 28 feet south of southwest garage corner, in southwest corner of concrete flagpole base; standard tablet stamped "12 RAK 1963 138".

2. USC and GS BM, Elev. 187.762

Waldoboro; on Route 220, 0.9 miles southeast of Sylvania building, on top of exposed bedrock about flush with ground, 300 feet southeast of summit of small hill, 26.5 feet southwest of road centerline, 26.5 feet northwest of northwest guardrail end, about 1 foot below road level; standard tablet stamped "P 152 1962".

3. USC and GS BM, Elev. 114.462

Waldoboro; set vertically in the northwest face of the Sylvania Electrical Products Company building, on Route 220, 1 foot southeast of the northwest corner and 1.5 feet above ground level; standard tablet stamped "N 152 1962".

4. USC and GS BM, Elev. 13.061

Waldoboro; on east bank of Medomak River at Storer's wharf, on top of a large mass of bedrock 31 feet southwest of southwest corner of warehouse, 24 feet northeast of northeast corner of coal shed; standard tablet stamped "L 152 1962".

5. USC and GS BM, Elev. 28.648

Waldoboro, on top of north end of west abutment of Mill Street bridge over Medomak River; standard tablet stamped "M 152 1962".

6. SCS BM, Elev. 52.06

Waldoboro; on top of south end of west abutment of U.S. Route 1 bridge over Medomak River; chiseled square.

7. SCS BM, Elev. 66.21

Waldoboro, at Winslows Mills, on top southeast corner of southeast concrete railing post of Cross Street over Medomak River; chiseled square.

8. SCS BM, Elev. 75.41

Waldoboro; at Winslows Mills, on south end of west abutment of Maine Central R.R. bridge over Medomak River, on southeast corner of 2nd granite block from top of abutment; chiseled square.

9. SCS BM, Elev. 80.49

Waldoboro; on top of large rock located near west edge of State Route 32, approximately 2,000 feet south of Wagner Bridge Road intersection, and 200 feet south of bridge over small stream, next to power pole #831; chiseled square.

10. Maine Department of Transportation BM, SCS Elev. 84.25

Waldoboro; approximately 50 feet east of Wagner Bridge Road bridge over Medomak River, 30 feet north of street, nail in notch of root on west side of 10 inch poplar tree, a stake is nailed to this tree facing the street, marked "BM 19".

11. SCS BM, Elev. 82.48

Waldoboro; on top of south end of west abutment of Wagner Bridge Road bridge over Medomak River; chiseled square.

12. SCS BM, Elev. 153.75

Waldoboro; at Orffs Corner, south corner of top concrete step at front door of Orffs Corner Community House.

13. USGS BM, Elev. 242.801

North Waldoboro; at, 70.5 feet southwest of southwest corner of grange hall, 34 feet west of centerline of road, on top of concrete post flush with ground; standard tablet stamped "BM 47 1935".

14. SCS BM, Elev. 130.20

North Waldoboro; on top of south end of east concrete abutment of Ellard Mank Road bridge over Medomak River; chiseled square.

15. SCS BM, Elev. 140.28

North Waldoboro; on top of west end of south concrete abutment of State Route 220 bridge over Medomak River; chiseled square.

16. USC and GS BM, Elev. 201.200

North Waldoboro; on State Route 220 approximately 1,350 feet northwest of Medomak River bridge, 23 feet east of centerline of road, 87 feet north of old driveway, on top of concrete post flush with ground; standard tablet stamped "C 47 1935".

17. SCS BM, Elev. 131.67

North Waldoboro; Noyes Road, at Little Medomak Pond Outlet Stream, on top, downstream end of northern steel culvert; paint spot.

18. SCS BM, Elev. 230.13

North Waldoboro; Storer Mountain Road, at Little Medomak Pond Outlet Stream, on top, upstream end of corrugated metal culvert; painted spot.

Glossary

Flood - An overflow or inundation onto land areas not normally covered by water that are used or usable by man. Floods are usually characterized as temporarily inundating land areas which are adjacent to a body of water such as an ocean, lake, stream or river.

Flood crest - The maximum stage or elevation reached by the waters of a flood at any location.

Flood peak - The maximum instantaneous discharge of a flood at a given location usually occurring at the flood crest.

Flood plain - The relatively flat area or lowlands adjoining the channel of a river, stream, or watercourse or ocean, lake, or other body of standing water which has been or may be covered by floodwater.

Flood profile - A graph which shows the relationship of water surface elevation to distance along the centerline of channel. It is used in this report to show the crest elevations of specific floods.

Floodway - That portion of the main stream channel plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights.

Frequency - A statistical measure of how often an event of a given size or magnitude should, on the average, be equalled or exceeded.

- (a) A 500-year frequency flood is one that is equalled or exceeded, on the average, once in 500 years. It has a 0.2 percent chance of being equalled or exceeded in any given year.
- (b) A 100-year frequency flood is one that is equalled or exceeded on the average, once in 100 years. It has a 1 percent chance of being equalled or exceeded in any given year.
- (c) A 50-year frequency flood is one that is equalled or exceeded on the average once in 50 years and has a 2 percent chance of being equalled or exceeded in any year.
- (d) A 10-year frequency flood is one that is equalled or exceeded, on the average, once in 10 years and has a 10 percent chance of being equalled or exceeded in any year.

Head - The height of water above any plane or reference.

Head loss - The effect of obstructions, such as narrow bridge openings or buildings, that limit the area through which water must flow, raising the surface of the water upstream from the obstruction.

Low chord - The elevation at which the bridge girder first begins to reduce the flow area of the channel.

Mean High Tide - The average height of high tides observed over a 19-year tidal cycle (1941-59).

NGVD - National Geodetic Vertical Datum, formerly Mean Sea Level (MSL) 1929.

Normal river flow - That condition which represents average low flow within channel banks.

Road overflow - The elevation of the point at which water first starts to flow over the road.

Station - Distance in feet along the centerline of the existing channel, increasing in an upstream direction.

Valley cross-section - The vertical and horizontal configuration of a valley normal to the direction of water runoff. It is generally composed of the left flood plain, channel segment (s), and the right flood plain including any islands within the normal channel.

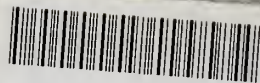
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5. U.S. Department of Agriculture, Soil Conservation Service, Technical Release 61, WSP-2 Computer Program, Washington, DC, 1976.
6. U.S. Army, Corps of Engineers, Tidal Flood Profiles, Waltham, MA, January 1980.
7. James W. Sewall Co., Aerial Photographs, 1:24,000 scale, Old Town, ME, May 1979.

U.S. Water Resources Council, A Unified National Program for Flood Plain Management, Washington, DC, September 1979.



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